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10/589,274

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EXAMINER

PALABRICA, RICARDO J

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/589,274	<b>Applicant(s)</b> SONG ET AL.	
	<b>Examiner</b> Rick Palabrica	<b>Art Unit</b> 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/26/09</u> .   | 6) <input type="checkbox"/> Other: ____.                          |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “an outer retention vessel having at least one coolant hole formed in a bottom thereof,” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2, 3, 5, and 6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 2 recites the limitation, “an outer retention vessel having at least one coolant hole formed in a side or bottom thereof.” Underlining provided. As presently set forth, the claim admits to having a single coolant hole in a side or bottom of the vessel.

There is neither an adequate description nor enabling disclosure as to how and in what manner the system can satisfactorily operate under core melt conditions with ONLY ONE coolant hole. Note that under such accident conditions, a large amount of debris can be expected to fall into the retention vessel to cause clogging of the SINGLE coolant hole. If there are no other holes to provide alternate coolant paths into the retention vessel, the system would be unable to perform its intended safety function. Additionally, having only one coolant hole will not meet the redundancy and diversity requirements of the U.S. Nuclear Regulatory Commission for fluid systems important to

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safety (see Appendix A to Part 50 –General Design Criteria for Nuclear Power Plants).

Applicant's claimed cooling system for a molten core is a fluid system important to safety and therefore subject to said requirements.

3. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites in the preamble the subcombination of a "cooling and retaining apparatus" that is inconsistent with the body of the claim that recites limitations directed to the combination of the "cooling and retaining apparatus in combination with a reactor cavity". This inconsistency presents the question as to whether the claim recites a combination or subcombination. There is insufficient antecedent basis for the limitation that is directed to the combination rather than to the subcombination because not all reactor cavities inherently include said apparatus.

Still as to claim 1 (and claim 7), the term "high-pressure" is a relative term which renders the claim indefinite. The term "high" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Tate et al. (U.S. 5,309,489) alone or Gabor et al. (U.S. H91) alone or Alsmeyer et al. (U.S. 6,658,077) in view of Gabor.

Tate et al.

Applicant's claim language reads on Tate et al. as follows (e.g., see Fig. 1): a) "molten core retention tank" reads on the containment sump beneath pressure vessel 2; b) "compressed gas tank" reads on accumulation tank 20; c) "cooling water storage tank" reads on suppression chamber 12"; d) "means for mixing inert gas" reads on piping 24.

The claims are replete with statements that are either essentially method limitations or statements of intended or desired use. For example, "for passively cooling and retaining molten core material from a reactor", "supplying high-pressure inert gas", "wherein steam generated ..." etc. These clauses, as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference, as long as the structure of the cited references is capable of performing the intended use. See MPEP 2111-2115.

See also MPEP 2114 that states:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647.

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Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531.

[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528.

As set forth in MPEP 2115, a recitation in a claim to the material or article worked upon does not serve to limit an apparatus claim.

The system in the above cited reference (as well as in each of the below cited references) is capable of being used in the same manner and for the intended or desired use as the claimed invention. Note that it is sufficient to show that said capability exists, which is the case for the cited reference.

For example, the sump in Tate et al. is capable of retaining molten core material from the reactor vessel. The claim neither defines the amount nor physical characteristics (temperature, pressure, flow rate) nor retention time for the molten core material. Absent such definition, the examiner interprets said parameters broadly, and reads it on any and all molten core parameters that can be retained by the sump at any suitable time (e.g., one minute). Also note that the suppression chamber 12 is installed higher than the sump beneath pressure vessel 2. The accumulation tank 20 is at a high pressure of 3 MPa (see col. 4, lines 25+).

As to the "inert gas", this is a material worked upon by the Tate et al. apparatus. Alternatively, an inert gas is a well known expedient to pressurize an accumulator, and its use in the Tate et al. apparatus would have been intuitively obvious to one of ordinary skill in the art at the time of the claimed invention. If applicant requires a teaching on said inert gas for an accumulator, see Kleimola (U.S. 3,984,282) at col. 19, lines 55+.

As to the mixing of the inert gas with the cooling water, note that in the event of an accident that results in failure of pressure vessel 2 in Tate et al., piping 24 provides the means for the inert gas from accumulation tank 20 to mix with the cooling water from suppression pool in the sump. The inert gas from tank 20 will flow through the break in the pressure vessel and mix with the cooling water, and the mixture will settle in the sump, which mixing and settling cannot be prevented.

Gabor et al.

Gabor et al. teach a core catcher that provides effective cooling of nuclear debris generated by destruction of nuclear fuel pins and/or reactor itself (see Figs. 1-9). Applicant's claim language reads on Gabor et al. as follows: a) "molten core retention tank" reads on the combination of steel liner 32, porous bed 56, and vapor release element 50, including its structural elements 52 and 503; b) "compressed gas tank" reads on the expedient for providing inert gas to interior volume of the reactor (see col. 4, lines 7+); c) "cooling water storage tank" reads on the expedient for providing cooling water to the porous bed (see col. 6, lines 64+ and Table 1); "means for mixing inert gas" reads on the annulus between the reactor vessel 14 and containment structure 28 (see Fig. 1 and col. 4, lines 7+).

Alsmeyer et al. in view of Gabor et al.

Alsmeyer et al. disclose the applicant's claim limitation except for the inert gas. They teach an apparatus for catching and cooling a core melt (see Fig). Applicant's claim language reads on Alsmeyer et al. as follows: a) "molten core retention tank"



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reads on the sump structure beneath pressure vessel 8; c) “cooling water storage tank” reads on water reservoir 9 (see col. 4, lines 26+),

As discussed above, Gabor et al., which also teach a core catcher, uses an inert gas inside the containment to provide a means for leak detection (see col. 4, lines 5+)

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus, as disclosed by Alsmeyer et al., to provide an inert gas atmosphere inside the containment, to gain the advantages thereof (i.e., for containment leak detection), because such modification is no more than the use of a well known expedient within the nuclear art.

Applicant’s claim language reads on the Alsmeyer et al.-Gabor et al. combination as follows: a) “means for mixing inert gas” reads on the annulus between the reactor vessel 8 and containment structure 2 of Alsmeyer et al., and mixture of inert gas with cooling water occurs upon failure of sacrificial material 6 and seal 7 during a core melt accident; b) “compressed gas tank” reads on the expedient for providing inert gas to interior volume of the reactor.

5. Claims 2, 3-5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Gabor et al. alone or the combination of Alsmeyer et al. and Gabor.

Gabor et al.

As to claims 2 and 3, applicant’s claim language reads on Gabor et al. as follows: a) “outer retention vessel” reads on structural element 52 (see Fig. 2); b)

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“porous protection vessel” reads on tube 507 having side apertures to provide porosity (see Fig. 7); c) “gravel layer” reads on porous bed 56 (see Fig. 2).

Alsmeyer et al. and Gabor

As to claims 2 and 3, applicant’s claim language reads on the combination as follows: a) “porous protection vessel” reads on porous body 3 of Alsmeyer et al.; b) “gravel layer” reads on the inherent gravel component of the concrete layer (shown in dashed lines) beneath the underside 3a of porous layer 3 of Alsmeyer et al..

Either one of Gabor et al. or Alsmeyer et al. – Gabor combination

As to claim 4, the specific configuration of the mixing means is a matter of design, which may be subject to constraints such as cost, space availability, reactor owner preference, etc.

As to claim 5, this is a product-by-process claim that either of the two references meet as per MPEP 2113, which states:

“[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777F.2d 695, 698, 227 USPQ 964, 966.

As to claim 7, installation of a check valve in any fluid-containing tank it would have been obvious to an artisan, as part of good engineering practice, because such valve provides a means to prevent back-flow of fluid into the tank.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Alsmeyer et al. and Gabor.

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Applicant's claim language, "screen layer" reads on Alsmeyer et al.'s seal 7, which screens porous body 3 from sacrificial material 6. Applicant has not defined the term, "screen". Absent such definition, the examiner applies the ordinary meaning of the term, i.e., "protection" or "shield", which is met by the seal in the above combination.

7. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tate et al.

As to claim 8, applicant's claim language, "intermediate storage tank" reads on drywell 11 that is connected to the suppression pool by vent tube 17 (see Fig. 5 and col. 6, lines 51+).

As to claim 9, it would have been obvious to one of ordinary skill in the art to have added a filter at the top of vent tube 17, as part of good engineering practice, to prevent debris from falling into the suppression pool.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References E-G further illustrate prior art.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 571-272-6880. The examiner can normally be reached on 6:00-4:30, Mon-Thurs.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rick Palabrica/  
Primary Examiner, Art Unit 3663

July 15, 2009